Vol. 9, No. 2 March-April, 1947

THE OSCILLOGRAPHER

Copyrighted and Published Bi-Monthly by the Allen B. Du Mont Laboratories, Inc., Passaic, New Jersey

A NEW OSCILLOGRAPH ACCESSORY FOR DIRECT MEASUREMENT OF SIGNAL AMPLITUDE

The Du Mont Type 264-A Voltage Calibrator

G. ROB'T MEZGER*

The cathode-ray oscillograph has developed rapidly, during its short existence as a scientific instrument, from a convenient auxiliary for the simple observation of waveforms for checking circuit performance, into a dependable, stable, necessary tool for the quantitative analysis of electrical circuits. The change in the techniques of development work in electronics has made necessary some type of device which will quickly calibrate any cathode-ray oscillograph in terms of voltage, so that absolute units can be read directly from the screen of the cathode-ray tube. To meet this need, the Type 264-A Voltage Calibrator has been designed.

This voltage calibrator employs a substitution method for calibration of the cathode-ray oscillograph, or for determination of the amplitude of an unknown signal. In either case, a signal of known amplitude is applied to the cathode-ray oscillograph, its deflection amplitude is measured, and its electrical magnitude, in volts, is indicated by the calibrator.

Description

The output of the Type 264-A Voltage Calibrator is essentially a square wave, the amplitude of which is continuously variable from 0 to 100 volts by means of a linear potentiometer. A direct-reading, calibrated dial on the output potentiometer is divided into 100 divisions. Connected in parallel with the output potentiometer is a conventional, four-step, decade, output attenuator. This provides four ranges of potential for the output potentiometer, namely: 0 to 0.1 volt, 0 to 1.0 volt, 0 to 10.0 volts, and 0 to 100 volts. The accuracy of the output voltage is within $\pm 5\%$ of full scale on each range.

* Manager, Technical Sales Department, Allen B. Du Mont Labs., Inc.

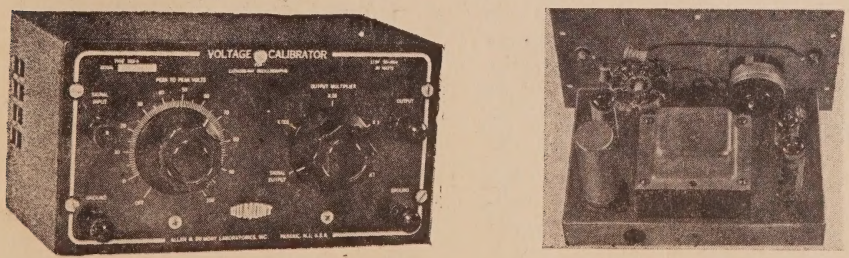

FIGURE 1—Type 264-A Voltage Calibrator.

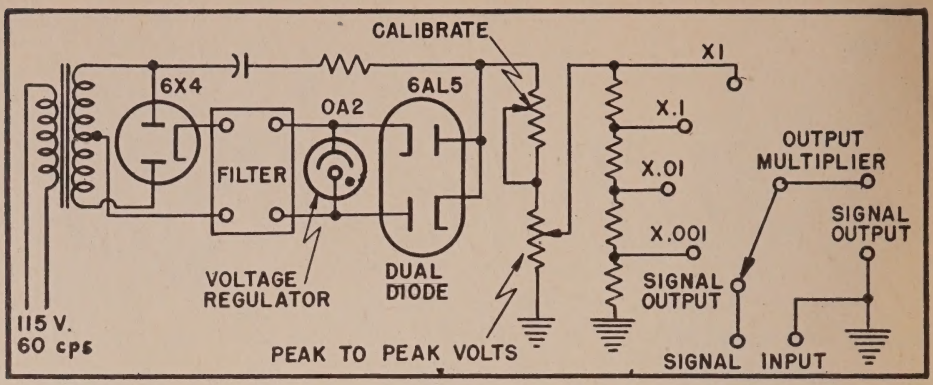

FIGURE 2—Simplified Schematic Circuit Diagram for the Type 264-A Voltage Calibrator.

Circuit

A simplified schematic diagram of the circuit of the Type 264-A Voltage Calibrator is shown in Figure 2. The instrument consists of a power supply, operated from a 115-volt, 50-60 cycle line, which applies equal positive and negative signals to a dual-diode clipper, the clipping level of which is accurately controlled by a gaseous regulator tube. The output potential is, thus, a clipped sine wave, the amplitude of which is accurately divided by a decade voltage divider and a linear potentiometer to give controlled output potentials from zero to 100 volts.

When the Type 264-A Voltage Calibrator is used with a cathode-ray oscillograph, the source of the signal under study is connected to the input terminals of the calibrator. The output terminals of the calibrator are then connected to the input terminals of the oscillograph. A fifth position of the OUTPUT MULTIPLIER switch connects the input and output terminals of the voltage calibrator together; thus, by merely throwing this switch, either the unknown signal or any one of four ranges of calibrating voltage may be applied to the input of the oscillograph. Binding post connections need not be changed to apply either signal or calibration voltage to the input of the cathode-ray oscillograph.

The application of the voltage calibrator to the measurement of signal amplitude is shown in Figures 3 and 4. These figures show a Type 264-A Voltage Calibrator being used with a Du Mont Type 241 Cathode-ray Oscillograph. Figures 2 and 3 show the OUTPUT MULTIPLIER switch in the SIGNAL OUTPUT position so that the signal voltage appears on the screen of the cathode-ray oscillograph as shown in Figure 3. By merely throwing the OUTPUT MULTIPLIER switch to any of the four ranges the waveform of the calibrating voltage appears on the screen, as shown in Figure 4. This photograph was taken with the calibrating voltage set to equal the signal voltage of Figure 3. The

FIGURE 3

OSCILLOGRAM SHOWING WAVEFORM OF UNKNOWN AMPLITUDE.

Signal voltage is passed through the voltage calibrator to the Y-Axis input terminals of the cathode-ray oscillograph.

Specifications

Electrical

Ranges.....0 to 0.1 volt
.....0 to 1.0 volt
.....0 to 10.0 volts
.....0 to 100.0 volts
Accuracy.....±5% of full scale on each range
Input Capacitance.....20 μμf*
(when signal is connected through the calibrator)
Regulation .....output is within ±2% with line-voltage variations of ±10%
Fuse Protection.....½ ampere
Power Supply:
Voltage .....115 v (rms)
Frequency .....50-60 cps
Power Consumption.....20 watts

Physical

Height .....4½ inches
Width .....8 inches
Depth .....5¾ inches
Weight .....approx. 5 lb

Catalog No.	*Type*	*Description*	*Code Word*	*Price*
1240-A	264-A	Voltage Calibrator	YALBP	$36.50

*The input impedance presented to the input signal is equal to the input impedance of the oscillograph in shunt with the capacitance of the Type 264-A Calibrator.

FIGURE 4

OSCILLOGRAM SHOWING WAVEFORM OF THE CALIBRATING VOLTAGE.

The calibrator has been adjusted (connections remaining unchanged) to substitute the calibrating signal of known amplitude for the signal of unknown amplitude. The amplitude may be read directly from the dials of the Calibrator.

relative amplitudes of the two signals can be compared with the calibrated scale on the face of the cathode-ray tube.

Physical Characteristics

The Type 264-A Voltage Calibrator is housed in a small, metal cabinet which is designed to be mounted conveniently on top of any commercial cathode-ray oscillograph. Once connected to the cathode-ray oscillograph and mounted thereon, the input terminals of the Calibrator become the input terminals for the oscillograph, and no further changes in connections will be necessary for most applications.

DU MONT ADVERTISING MAN HONORED BY FRANCE

Among the various honors accruing to Du Mont men is that of "Officier de l'Instruction Publique" just awarded to Austin C. Lescarboura who handles Du Mont instrument and tube advertising, as well as technical news publicity. This distinction, very rare among native-born Americans, is in recognition of the many technical services rendered by Mr. Lescarboura to French

industry and science, and more recently in aiding members of the French Industrial Production Mission in this country, some of whom he has brought to Du Mont headquarters.

Mr. Lescarboura already holds the French order of "Officier d'Academie" awarded to him in 1919 for technical services rendered to France and the Allies in World War 1. He is the former Editor of Popular Science Monthly, former Managing Editor of Scientific American, former Editor of various trade and technical publications, and author of half a dozen published books. His affiliation with the Du Mont organization dates back to the basement days in Upper Montclair, and with Dr. Du Mont all the way back to the DeForest Radio days in Passaic when he was handling DeForest advertising and publicity, and the programs for the DeForest television station under Dr. Du Mont's supervision.

NEW OSCILLOGRAPHS INTRODUCED AT IRE EXHIBITION

The annual exhibition of manufacturers' products at the convention of the Institute of Radio Engineers again found Du Mont represented with its line of oscillographic equipment. This year the show was held at Grand Central Palace in New York and extended from March 3-7.

The Du Mont booth, shown in the picture above, featured several new oscillographs and test equipment, in addition to the standard instruments. To the left of the picture can be seen the new Type 280 Cathode-ray Oscillograph, while to the right is a rack-mounted sweep-frequency generator for production testing. Also shown was the Type 275-A Cathode-ray Polar-coordinate Indicator which goes into production later this year.

One of the innovations in the Du Mont display was the new pre-fabricated booth which will also be used in forthcoming shows. The booth can be arranged for either a ten-foot wide or twenty-foot wide display. The back-center panel is in Du Mont green with grey side extensions.

DUMONT *Precision Electronics and Television*

ALLEN B. DU MONT LABORATORIES, INC., 1000 Main Ave., Clifton, New Jersey